

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-V (OLD) - EXAMINATION – SUMMER 2018**

**Subject Code:150605**

**Date:04/05/2018**

**Subject Name:Structural Analysis - III**

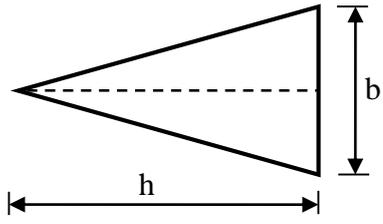
**Time:02:30 PM to 05:00 PM**

**Total Marks: 70**

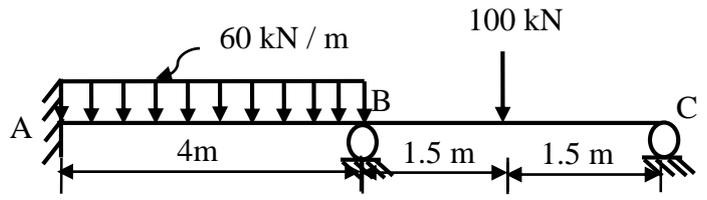
**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

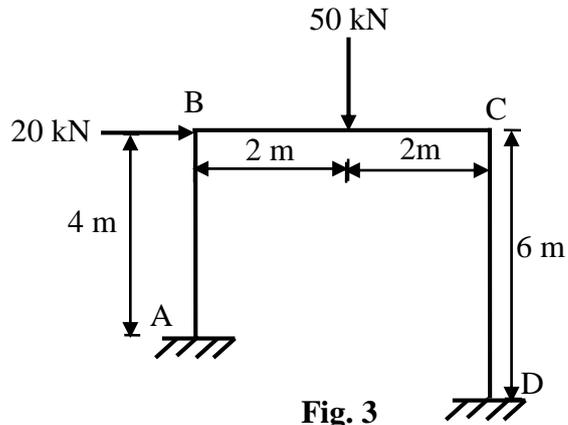
- Q.1** (a) Derive an expression for meridional stress and hoop stress for a spherical dome subjected to UDL. **07**
- (b) Derive an expression for shear force and bending moment at support for a circular beam supported symmetrically. **07**
- Q.2** (a) Distinguish between Stiffness Matrix Method and Flexibility Matrix Method. **07**
- (b) Explain plastic bending of beam. **07**
- OR**
- (b) Determine shape factor for the triangular section as shown in Fig. 1. **07**
- Q.3** (a) A continuous beam ABC is subjected to collapse loaded as shown in Fig. 2. Determine the requires  $M_p$ . **07**
- (b) A spherical dome with a span of 15 m and central rise of 3m has total load (DL + LL)of  $10 \text{ kN/m}^2$ . Calculate meridional and hoop force at the mid height. **07**
- OR**
- Q.3** (a) Derive expression for meridional stress and hoop stress for a conical dome subjected to UDL. **07**
- (b) A beam curved in plane with a radius of 5 m and central subtended angle is  $75^\circ$ . The beam is subjected to load of  $10 \text{ kN/m}$  and is fixed at both the ends. If the section of beam is  $230 \times 600 \text{ mm}$ . Find shear force, bending moment and torsional moment. Adopt  $G = 0.4 E$  for concrete. **07**
- Q.4** (a) A conical dome of 12 m diameter with a central rise of 4 m supports total uniformly distributed load of  $4 \text{ kN/m}^2$  over the surface inclusive of self weight. Determine meridional and hoop force at ring beam level. **07**
- (b) Explain concept of Torsional factor. **07**
- OR**
- Q.4** (a) A beam circular in plan has radius of 8m and is supported at equally spaced 8 supports. It is loaded by a wall of  $40 \text{ kN/m}$ . Calculate the maximum values of shear force, bending moment and Torsional moment. **07**
- (b) Determine the plastic moment capacity of the frame for the loading shown in Fig. 3. **07**
- Q.5** Analyse the continuous beam as shown in Fig. 2 by stiffness matrix method. **14**
- OR**
- Q.5** Analyse the continuous beam as shown in Fig. 2 by flexibility matrix method. **14**



**Fig.1**



**Fig. 2**



**Fig. 3**

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